In re Application of Hans-Wilm Heinrich
Serial No. 10/727,247
Filed: December 3, 2003

RESPONSE TO NON-FINAL OFFICE ACTION OF FEBRUARY 7, 2005

The following is the current set of claims that replaces all earlier versions of the claims:

Claims 1-20. Cancelled.

21. **(Currently Amended)** A method of producing a sintered cemented carbide body comprising the steps of

(a) providing a powder mixture comprising tungsten carbide powder , a binder metal powder comprising at least one metal of the iron group or an alloy thereof, and at least one or both of a solid solution carbide powder of zirconium and niobium or a solid solution carbonitride powder of zirconium and niobium ~~of the carbides and carbonitrides of both, zirconium and niobium~~;

(b) forming a green compact of said powder mixture; and

(c) vacuum sintering or sinter-HIP said green compact at a temperature of from 1400 to 1560 °C;

~~characterized in that in step (a) a powdered solid solution of the carbides or carbonitrides of zirconium and niobium is used to form said powder mixture~~.

22. **(Currently Amended)** The method of claim 21 wherein [a solid solution of a carbide or carbonitride of a combination of zirconium and niobium] the solid solution carbide powder of zirconium and niobium or the solid solution carbonitride powder of zirconium and niobium having a mass ratio Nb/(Zr + Nb) equal to greater than about 0.5 [is used as said powdered solid solution of a carbide or carbonitride of a combination of zirconium and niobium].

23. **(Currently Amended)** The method of claim 22 wherein [a powdered solid solution of a carbide or carbonitride of a combination of zirconium and niobium] the solid solution carbide powder of zirconium and niobium or the

solid solution carbonitride powder of zirconium and niobium having a mass ratio Nb/(Zr + Nb) greater than or equal to about 0.6 [is used].

24. **(Original)** The method of claim 21 wherein the binder metal powder comprises one or more of cobalt powder, nickel powder and iron powder.

25. **(Original)** The method of claim 24 wherein said binder metal powder additionally comprises at least one of chromium and tungsten.

26. **(Original)** The method of claim 21 wherein said binder metal powder comprises between about 3 weight percent and about 15 weight percent of the total mass of said powder mixture.

27. **(Original)** The method of claim 21 wherein said powder mixture additionally comprises at least one carbide, nitride or carbonitride of one or more of titanium, hafnium, vanadium, tantalum, chromium, and molybdenum.

28. **(Currently Amended)** The method of claim 21 wherein [said powdered solid solution of a carbide or carbonitride of a combination of zirconium and niobium] the total of the solid solution carbide powder of zirconium and niobium and the solid solution carbonitride powder of zirconium and niobium comprises between about 1 weight percent and about 15 weight percent of the total mass of said powder mixture.

29. **(Original)** The method of claim 21 wherein said powder mixture comprises at least one of the elements titanium, hafnium, vanadium, tantalum, chromium and molybdenum in an amount between about 1 weight percent and about 8 weight percent of the total mass of said powder mixture.

Claims 30 through 35. Cancelled

36. **(New)** The method of claim 21 wherein the total of the solid solution carbide powder of zirconium and niobium and the solid solution carbonitride powder of zirconium and niobium comprises between greater than 10

weight percent and about 15 weight percent of the total mass of said powder mixture.

37. (**New**) A method of producing a sintered cemented carbide body comprising the steps of

providing a powder mixture comprising tungsten carbide powder, a binder metal powder comprising at least one metal of the iron group or an alloy thereof, and at least one or both of one or both of a solid solution carbide powder consisting essentially of zirconium and niobium or a solid solution carbonitride powder consisting essentially of zirconium and niobium;

forming a green compact of said powder mixture; and

vacuum sintering or sinter-HIP said green compact at a temperature of from 1400 to 1560 °C.

38. (**New**) The method of claim 37 wherein the solid solution carbide powder of zirconium and niobium or the solid solution carbonitride powder of zirconium and niobium having a mass ratio Nb/(Zr + Nb) equal to greater than about 0.5.

39. (**New**) The method of claim 37 wherein the solid solution carbide powder of zirconium and niobium or the solid solution carbonitride powder of zirconium and niobium having a mass ratio Nb/(Zr + Nb) greater than or equal to about 0.6.

40. (**New**) The method of claim 37 wherein the total of the solid solution carbide powder of zirconium and niobium and the solid solution carbonitride powder of zirconium and niobium comprises between greater than 10 weight percent and about 15 weight percent of the total mass of said powder mixture.

41. **(New)** A method of producing a sintered cemented carbide body that contains a solid solution carbide of tungsten, zirconium and niobium, the method comprising the steps of

providing a powder mixture comprising tungsten carbide powder, a binder metal powder comprising at least one metal of the iron group or an alloy thereof, and at least one or both of one or both of a solid solution carbide powder consisting essentially of zirconium and niobium or a solid solution carbonitride powder consisting essentially of zirconium and niobium;

forming a green compact of said powder mixture; and

vacuum sintering or sinter-HIP said green compact at a temperature of from 1400 to 1560 °C.